PART I

SURFACE WATER STANDARDS WITH GENERAL, STATEWIDE APPLICATION

9 VAC 25-260-5. Definitions.

The following words and terms when used in this chapter shall have the following meanings unless the context clearly indicates otherwise:

"Board" means State Water Control Board.

"Criteria" means elements of the board's water quality standards, expressed as constituent concentrations, levels, or narrative statements, representing a quality of water that supports a particular use. When criteria are met, water quality will generally protect the designated use.

"Designated uses" means those uses specified in water quality standards for each water body or segment whether or not they are being attained.

"Existing uses" means those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards.

<u>“Primary Contact Recreation” means any water-based form of recreation, the practice of which has a high probability for total body immersion or ingestion of water (examples include but are not limited to swimming, water skiing, canoeing and kayaking).</u>

"Use attainability analysis" means a structured scientific assessment of the factors affecting the attainment of the use which may include physical, chemical, biological, and economic factors as described in 9 VAC 25-260-10 G.

"Water quality standards" means provisions of state or federal law which consist of a designated use or uses for the waters of the Commonwealth and water quality criteria for such waters based

upon such uses. Water quality standards are to protect the public health or welfare, enhance the quality of water and serve the purposes of the State Water Control Law (§ 62.1-44.2 et seq. of the Code of Virginia) and the federal Clean Water Act (33 USC §1251 et seq.).

9 VAC 25-260-140. Criteria for surface water.

A. Instream water quality conditions shall not be acutely[2] or chronically[3] toxic except as allowed in 9 VAC 25-260-20 B (mixing zones). The following are definitions of acute and chronic toxicity conditions:

"Acute toxicity" means an adverse effect that usually occurs shortly after exposure to a pollutant. Lethality to an organism is the usual measure of acute toxicity. Where death is not easily detected, immobilization is considered equivalent to death.

"Chronic toxicity" means an adverse effect that is irreversible or progressive or occurs because the rate of injury is greater than the rate of repair during prolonged exposure to a pollutant. This includes low level, long-term effects such as reduction in growth or reproduction.

B. The following table is a list of numerical water quality criteria for specific parameters.

1. For those waters with multiple designated beneficial uses, the most stringent criteria in the following table shall apply.

2. When information has become available from the Environmental Protection Agency to calculate additional aquatic life or human health criteria not contained in the table, the board may employ these values in establishing effluent limitations or other limitations pursuant to 9 VAC 25-260-20 A necessary to protect designated uses until the board has completed the regulatory standards adoption process.

Table of Parameters[8,10]

	AQUATIC LIFE				HUMAN HEALTH	
	FRESHWATER		SALTWATER			
	ACUTE[2]	CHRONIC[3]	ACUTE[2]	CHRONIC[3]	PUBLIC WATER SUPPLIES[4]	ALL OTHER SURFACE WATERS[5]
SUBSTANCE[4]	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Acenaphthene					1,200	2,700
Aldrin [c]	3.0	0.3	1.3	0.13	0.0013	0.0014
Ammonia See 9 VAC 25-260-155	~~See Table 1~~	~~See Table 2~~	~~See Tables 3 and 4~~			
Anthracene					9,600	110,000
Antimony					14	4,300
Arsenic					50	
Arsenic III[1]	360	190	69	36		
Bacteria	See section 9 VAC 25-260-160 and 170					
Barium					2,000	
Benzene [c]					12	710
Benzo(a) anthracene [c]					0.044	0.49
Benzo(b) fluoranthene [c]					0.044	0.49
Benzo(k) fluoranthene [c]					0.044	0.49
Benzo(a)pyrene [c]					0.044	0.49
Bromoform [c]					44	3,600
Butyl benzyl phthalate					3,000	5,200
Cadmium[1]	3.9 (See Note 9)	1.1 (See Note 9)	43	9.3		
Carbon Tetrachloride [c]					2.5	45
Chlordane [c]	2.4	0.0043	0.09	0.0040	0.0058	0.0059
Chloride	860,000	230,000			250,000**	
Chlorine Total Residual	19	11				
Chlorine Produced Oxidant			13	7.5		
Chlorodibromomethane					690	57,000

Chloroform [c]					57	4,700
2-Chlorophenol					120	400
Chlorpyrifos	0.083	0.041	0.011	0.0056		
Chromium III[1]	1700 (See Note 9)	210 (See Note 9)				
Chromium VI[1]	16	11	1,100	50		
Chrysene [c]					0.044	0.49
Copper[1]	18 (See Note 9)	12 (See Note 9)	5.9	3.8	1,300	
Cyanide	22	5.2	1.0	1.0	700	215,000
DDD [c]					0.0083	0.0084
DDE [c]					0.0059	0.0059
DDT [c]	1.1	0.0010	0.13	0.0010	0.0059	0.0059
Demeton		0.1		0.1		
Dibenz(a,h) anthracene [c]					0.044	0.49
Dibutyl phthalate					2,700	12,000
Dichloromethane [c]					47	16,000
1,2-Dichlorobenzene					2,700	17,000
1,3-Dichlorobenzene					400	2,600
1,4-Dichlorobenzene					400	2,600
Dichlorobromomethane [c]					5.6	460
1,2-Dichloroethane [c]					3.8	990
1,1-Dichloroethylene					310	17,000
2,4 Dichlorophenol					93	790
2,4-dichlorophenoxy acetic acid (2,4-D)					71	
Dieldrin [c]	2.5	0.0019	0.71	0.0019	0.0014	0.0014
Diethyl phthalate					23,000	120,000
Di-2-Ethylhexyl Phthalate [c]					18	59
2,4 Dimethylphenol					540	2,300
2,4-Dinitrotoluene [c]					1.1	91
Dioxin See 9 VAC 25-260-150						
Dissolved Oxygen See 9 VAC 25-260-50						
Endosulfan	0.22	0.056	0.034	0.0087	110	240
Endrin	0.18	0.0023	0.037	0.0023	0.76	0.81
Ethylbenzene					3,100	29,000
Fecal Coliform See Part II (9 VAC 25-260-160 et seq.) of this chapter						

Fluoranthene					300	370
Fluorene					1,300	14,000
Foaming agents (measured as methylene blue active substances)					500**	
Guthion		0.01		0.01		
Heptachlor [c]	0.52	0.0038	0.053	0.0036	0.0021	0.0021
Hexachlorocyclohexane (Lindane)	2.0	0.080	0.16	0.01	7	25
Hydrogen Sulfide		2.0		2.0		
Indeno(1,2,3-cd)pyrene [c]					0.044	0.49
Iron					300**	
Isophorone					6,900	490,000
Kepone		zero		zero		
Lead[1]	120 (See Note 9)	14 (See Note 9)	240	9.3	15	
Malathion		0.1		0.1		
Manganese					50**	
Mercury[1,6,7]	2.4	0.012	2.1	0.025	0.052	0.053
Methoxyclor		0.03		0.03	40	
Mirex		zero		zero		
Monochlorobenzene					680	21,000
Nickel[1]	180 (See Note 9)	20 (See Note 9)	75	8.3	610	4,600
Nitrate (as N)					10,000	
Nitrobenzene					17	1,900
Parathion	0.065	0.013				
PCB-1242 [c]		0.014		0.030	0.00044	0.00045
PCB-1254 [c]		0.014		0.030	0.00044	0.00045
PCB-1221 [c]		0.014		0.030	0.00044	0.00045
PCB-1232 [c]		0.014		0.030	0.00044	0.00045
PCB-1248 [c]		0.014		0.030	0.00044	0.00045
PCB-1260 [c]		0.014		0.030	0.00044	0.00045
PCB-1016 [c]		0.014		0.030	0.00044	0.00045
Pentachlorophenol [c]	$e^{(1.005(pH) -4.830)}$	$e^{(1.005(pH) -5.290)}$	13	7.9	2.8	82
pH See 9 VAC 25-260-50						
Phenol					21,000	4,600,000

Phosphorus (Elemental)				0.10		
Pyrene					960	11,000
Radionuclides						
Gross Alpha Particle Activity					15 pCi/l	15 pCi/l
Beta Particle and Photon Activity (formerly manmade radionuclides)					4 mrem	4 mrem
Strontium-90					8 pCi/l	8 pCi/l
Tritium					20,000pCi/l	20,000pCi/l
Selenium[1]	20	5.0	300	71	170	11,000
Silver[1]	4.1 (See Note 9)		2.3			
Sulfate					250,000**	
Temperature See 9 VAC 25-260-50						
Tetrachloroethylene					320	3,500
Toluene					6,800	200,000
Total dissolved solids					500,000**	
Toxaphene[6] [c]	0.73	0.0002	0.21	0.0002	0.0073	0.0075
1,2,4 Trichlorobenzene					260	950
Trichloroethylene [c]					27	810
2,4,6-Trichlorophenol [c]					21	65
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)					50	
Tributyltin	0.46	0.026	0.36	0.001		
Vinyl Chloride [c]					20	5,300
Zinc[1]	120 (See Note 9)	110 (See Note 9)	95	86	5,000**	

NOTES:

*= Hardness as calcium carbonate mg/l CaCO3. The minimum hardness allowed for use in this equation shall not be less than 25 mg/l, as calcium carbonate, even if the actual ambient hardness is less than 25 mg/l as calcium carbonate. The maximum hardness value for use in this equation shall not exceed 400 mg/l as calcium carbonate, even if the actual ambient hardness is greater than 400 mg/l as calcium carbonate.

** = To maintain acceptable taste, odor or aesthetic quality of drinking water.

c = Known or suspected carcinogen, human health standards are for a risk level of 10^{-5}.

[1] = All metals shall be measured as dissolved. All aquatic life criteria for metals apply to the biologically available form of the metal. Metals measured as dissolved shall be considered to be biologically available, or, because local receiving water characteristics may otherwise affect the biological availability of the metal, the biologically available equivalent measurement of the metal can be further defined by determining a Water Effect Ratio (WER) and multiplying the numerical value shown in 9 VAC 25-260-140 B by the WER. Refer to 9 VAC 25-260-140 F.

[2] = One hour average concentration not to be exceeded more than once every three years on the average.

[3] = Four day average concentration not to be exceeded more than once every three years on the average except for ammonia. Ammonia is a 30 day average not to be exceeded more than once every three years on the average.

[4] = Unless otherwise noted, these criteria have been calculated to protect human health from toxic effects through drinking water and fish consumption.

[5] = Unless otherwise noted, these criteria have been calculated to protect human health from toxic effects through fish consumption.

[6] = Chronic aquatic life values have been calculated to protect wildlife from harmful effects through ingestion of contaminated tissue. However, the criteria will also protect aquatic life from toxic effects.

[7] = Chronic aquatic life criteria applies to methyl mercury. This criteria will protect the marketability of natural resources, e.g., fish and shellfish.

[8] = See 9 VAC 25-260-310 for additional standards or effluent limits which are site-specific.

[9] = Freshwater aquatic life criteria for these metals are expressed as a function of total hardness as $CaCO_3$ (mg/l), and as a function of the pollutant's water effect ratio (WER) as defined in 9 VAC 25-260-140 F. The equations are provided in the matrix below. To maintain consistency when using these equations to calculate criteria, intermediate calculations should be rounded to four significant digits and the final criterion's value should be rounded to two significant digits. Values displayed above in the table are examples and correspond to a total hardness of 100 mg/l and a water effect ratio of 1.0.

Acute criterion=WER $\exp\{m_A[\ln(\text{hardness}^*)]+b_A\}$

Chronic criterion=WER $\exp\{m_C[\ln(\text{hardness}^*)]+b_C\}$

	m_A	b_A	m_C	b_C
Cadmium	1.128	-3.828	0.7852	-3.490
Chromium (III)	0.8190	3.688	0.8190	1.561
Copper	0.9422	-1.464	0.8545	-1.465
Lead	1.273	-1.084	1.273	-3.259
Nickel	0.8460	1.312	0.8460	-0.8840
Silver	1.72	-6.52	.....	.....
Zinc	0.8473	0.8604	0.8473	0.7614

Note: The term "exp" represents the base e exponential function.

[10] = The flows listed below are default design flows for calculating steady state waste load allocations unless statistically valid methods are employed which demonstrate compliance with the duration and return frequency of the water quality criteria.

Aquatic Life:

Acute criteria 1Q10

Chronic criteria 7Q10

Chronic criteria (ammonia) 30Q10

Human Health:

Non-carcinogens 30Q5

Carcinogens Harmonic mean (An exception to this is for the carcinogen dioxin. The applicable stream flow for dioxin is listed in 9 VAC 25-260-150 B.)

The following are defined for this section:

"1Q10" means the lowest flow averaged over a period of one day which on a statistical basis can be expected to occur once every 10 climatic years.

"7Q10" means the lowest flow averaged over a period of seven consecutive days that can be statistically expected to occur once every 10 climatic years.

"30Q5" means the lowest flow averaged over a period of 30 consecutive days that can be statistically expected to occur once every five climatic years.

"30Q10" means the lowest flow averaged over a period of 30 consecutive days that can be statistically expected to occur once every 10 climactic years.

"Averaged" means an arithmetic mean.

"Climatic year" means a year beginning on April 1 and ending on March 31.

~~TABLE 1***~~

~~Acute Ammonia Criteria for Freshwater~~

~~Total Ammonia (mg/liter)****~~

~~Temperature (°C)~~

~~pH~~	~~0 C~~	~~5 C~~	~~10 C~~	~~15 C~~	~~20 C~~	~~25 C~~	~~30 C~~
~~6.50~~	~~35~~	~~33~~	~~31~~	~~30~~	~~29~~	~~29~~	~~29~~
~~6.75~~	~~32~~	~~30~~	~~28~~	~~27~~	~~27~~	~~26~~	~~26~~
~~7.00~~	~~28~~	~~26~~	~~25~~	~~24~~	~~23~~	~~23~~	~~23~~
~~7.25~~	~~23~~	~~22~~	~~20~~	~~19.7~~	~~19.2~~	~~19.0~~	~~19~~
~~7.50~~	~~17.4~~	~~16.3~~	~~15.5~~	~~14.9~~	~~14.6~~	~~14.5~~	~~14.5~~
~~7.75~~	~~12.2~~	~~11.4~~	~~10.9~~	~~10.5~~	~~10.3~~	~~10.2~~	~~10.3~~
~~8.00~~	~~8.0~~	~~7.5~~	~~7.1~~	~~6.9~~	~~6.8~~	~~6.8~~	~~7.0~~
~~8.25~~	~~4.5~~	~~4.2~~	~~4.1~~	~~4.0~~	~~3.9~~	~~4.0~~	~~4.1~~
~~8.50~~	~~2.6~~	~~2.4~~	~~2.3~~	~~2.3~~	~~2.3~~	~~2.4~~	~~2.6~~
~~8.75~~	~~1.47~~	~~1.40~~	~~1.37~~	~~1.38~~	~~1.42~~	~~1.52~~	~~1.66~~
~~9.00~~	~~0.86~~	~~0.83~~	~~0.83~~	~~0.86~~	~~0.91~~	~~1.01~~	~~1.16~~

~~TABLE 2***~~

~~Chronic Ammonia Criteria for Freshwater~~

~~Total Ammonia (mg/liter)****~~

~~Temperature (°C)~~

~~pH~~	~~0 C~~	~~5 C~~	~~10 C~~	~~15 C~~	~~20 C~~	~~25 C~~	~~30 C~~
~~6.50~~	~~3.02~~	~~2.82~~	~~2.66~~	~~2.59~~	~~2.53~~	~~2.5~~	~~2.5~~
~~6.75~~	~~3.02~~	~~2.82~~	~~2.66~~	~~2.59~~	~~2.53~~	~~2.5~~	~~2.5~~
~~7.00~~	~~3.02~~	~~2.82~~	~~2.66~~	~~2.59~~	~~2.53~~	~~2.5~~	~~2.5~~
~~7.25~~	~~3.02~~	~~2.82~~	~~2.66~~	~~2.59~~	~~2.53~~	~~2.5~~	~~2.5~~
~~7.50~~	~~3.02~~	~~2.82~~	~~2.66~~	~~2.59~~	~~2.53~~	~~2.5~~	~~2.5~~
~~7.75~~	~~2.80~~	~~2.60~~	~~2.47~~	~~2.38~~	~~2.35~~	~~2.3~~	~~2.4~~
~~8.00~~	~~1.82~~	~~1.71~~	~~1.62~~	~~1.57~~	~~1.55~~	~~1.56~~	~~1.59~~
~~8.25~~	~~1.03~~	~~0.97~~	~~0.93~~	~~0.91~~	~~0.90~~	~~0.91~~	~~0.95~~
~~8.50~~	~~0.58~~	~~0.55~~	~~0.53~~	~~0.53~~	~~0.53~~	~~0.55~~	~~0.58~~
~~8.75~~	~~0.34~~	~~0.32~~	~~0.31~~	~~0.31~~	~~0.32~~	~~0.35~~	~~0.38~~
~~9.00~~	~~0.20~~	~~0.19~~	~~0.19~~	~~0.20~~	~~0.21~~	~~0.23~~	~~0.27~~

~~TABLE 3~~

~~Acute Ammonia Criteria for Saltwater~~

~~Total Ammonia (mg/liter)****~~

~~Temperature (°C)~~

~~pH~~	~~0 C~~	~~5 C~~	~~10 C~~	~~15 C~~	~~20 C~~	~~25 C~~	~~30 C~~	~~35 C~~
				~~Salinity = 10 g/kg~~				
~~7.0~~	~~270~~	~~191~~	~~131~~	~~92~~	~~62~~	~~44~~	~~29~~	~~21~~
~~7.2~~	~~175~~	~~121~~	~~83~~	~~58~~	~~40~~	~~27~~	~~19~~	~~13~~
~~7.4~~	~~110~~	~~77~~	~~52~~	~~35~~	~~25~~	~~17~~	~~12~~	~~8.3~~
~~7.6~~	~~69~~	~~48~~	~~33~~	~~23~~	~~16~~	~~11~~	~~7.7~~	~~5.6~~
~~7.8~~	~~44~~	~~31~~	~~21~~	~~15~~	~~10~~	~~7.1~~	~~5.0~~	~~3.5~~
~~8.0~~	~~27~~	~~19~~	~~13~~	~~9.4~~	~~6.4~~	~~4.6~~	~~3.1~~	~~2.3~~
~~8.2~~	~~18~~	~~12~~	~~8.5~~	~~5.8~~	~~4.2~~	~~2.9~~	~~2.1~~	~~1.5~~
~~8.4~~	~~11~~	~~7.9~~	~~5.4~~	~~3.7~~	~~2.7~~	~~1.9~~	~~1.4~~	~~1.0~~
~~8.6~~	~~7.3~~	~~5.0~~	~~3.5~~	~~2.5~~	~~1.8~~	~~1.3~~	~~0.98~~	~~0.75~~
~~8.8~~	~~4.6~~	~~3.3~~	~~2.3~~	~~1.7~~	~~1.2~~	~~0.92~~	~~0.71~~	~~0.56~~
~~9.0~~	~~2.9~~	~~2.1~~	~~1.5~~	~~1.1~~	~~0.85~~	~~0.67~~	~~0.52~~	~~0.44~~

~~Acute Ammonia Criteria for Saltwater~~

~~Total Ammonia (mg/l)****~~

~~Temperature (°C)~~

~~pH~~	~~0 C~~	~~5 C~~	~~10 C~~	~~15 C~~	~~20 C~~	~~25 C~~	~~30 C~~	~~35 C~~
				~~Salinity = 20 g/kg~~				
~~7.0~~	~~291~~	~~200~~	~~137~~	~~96~~	~~64~~	~~44~~	~~31~~	~~21~~
~~7.2~~	~~183~~	~~125~~	~~87~~	~~60~~	~~42~~	~~29~~	~~20~~	~~14~~
~~7.4~~	~~116~~	~~79~~	~~54~~	~~37~~	~~27~~	~~18~~	~~12~~	~~8.7~~
~~7.6~~	~~73~~	~~50~~	~~35~~	~~23~~	~~17~~	~~11~~	~~7.9~~	~~5.6~~
~~7.8~~	~~46~~	~~31~~	~~23~~	~~15~~	~~11~~	~~7.5~~	~~5.2~~	~~3.5~~
~~8.0~~	~~29~~	~~20~~	~~14~~	~~9.8~~	~~6.7~~	~~4.8~~	~~3.3~~	~~2.3~~
~~8.2~~	~~19~~	~~13~~	~~8.9~~	~~6.2~~	~~4.4~~	~~3.1~~	~~2.1~~	~~1.6~~
~~8.4~~	~~12~~	~~8.1~~	~~5.6~~	~~4.0~~	~~2.9~~	~~2.0~~	~~1.5~~	~~1.1~~
~~8.6~~	~~7.5~~	~~5.2~~	~~3.7~~	~~2.7~~	~~1.9~~	~~1.4~~	~~1.0~~	~~0.77~~
~~8.8~~	~~4.8~~	~~3.3~~	~~2.5~~	~~1.7~~	~~1.3~~	~~0.94~~	~~0.73~~	~~0.56~~
~~9.0~~	~~3.1~~	~~2.3~~	~~1.6~~	~~1.2~~	~~0.87~~	~~0.69~~	~~0.54~~	~~0.44~~

~~Acute Ammonia Criteria for Saltwater~~

~~Total Ammonia (mg/l)****~~

~~Temperature (°C)~~

~~pH~~	~~0 C~~	~~5 C~~	~~10 C~~	~~15 C~~	~~20 C~~	~~25 C~~	~~30 C~~	~~35 C~~
				~~Salinity = 30 g/kg~~				
~~7.0~~	~~312~~	~~208~~	~~148~~	~~102~~	~~71~~	~~48~~	~~33~~	~~23~~
~~7.2~~	~~196~~	~~135~~	~~94~~	~~64~~	~~44~~	~~31~~	~~21~~	~~15~~
~~7.4~~	~~125~~	~~85~~	~~58~~	~~40~~	~~27~~	~~19~~	~~13~~	~~9.4~~
~~7.6~~	~~79~~	~~54~~	~~37~~	~~25~~	~~21~~	~~12~~	~~8.5~~	~~6.0~~
~~7.8~~	~~50~~	~~33~~	~~23~~	~~16~~	~~11~~	~~7.9~~	~~5.4~~	~~3.7~~
~~8.0~~	~~31~~	~~21~~	~~15~~	~~10~~	~~7.3~~	~~5.0~~	~~3.5~~	~~2.5~~
~~8.2~~	~~20~~	~~14~~	~~9.6~~	~~6.7~~	~~4.6~~	~~3.3~~	~~2.3~~	~~1.7~~
~~8.4~~	~~12.7~~	~~8.7~~	~~6.0~~	~~4.2~~	~~2.9~~	~~2.1~~	~~1.6~~	~~1.1~~
~~8.6~~	~~8.1~~	~~5.6~~	~~4.0~~	~~2.7~~	~~2.0~~	~~1.4~~	~~1.1~~	~~0.81~~
~~8.8~~	~~5.2~~	~~3.5~~	~~2.5~~	~~1.8~~	~~1.3~~	~~1.0~~	~~0.75~~	~~0.58~~
~~9.0~~	~~3.3~~	~~2.3~~	~~1.7~~	~~1.2~~	~~0.94~~	~~0.71~~	~~0.56~~	~~0.46~~

~~TABLE 4~~

~~Chronic Ammonia Criteria for Saltwater~~

~~Total Ammonia (mg/l)****~~

~~Temperature (°C)~~

~~pH~~	~~0 C~~	~~5 C~~	~~10 C~~	~~15 C~~	~~20 C~~	~~25 C~~	~~30 C~~	~~35 C~~
				~~Salinity = 10 g/kg~~				
~~7.0~~	~~41~~	~~29~~	~~20~~	~~14~~	~~9.4~~	~~6.6~~	~~4.4~~	~~3.1~~
~~7.2~~	~~26~~	~~18~~	~~12~~	~~8.7~~	~~5.9~~	~~4.1~~	~~2.8~~	~~2.0~~
~~7.4~~	~~17~~	~~12~~	~~7.8~~	~~5.3~~	~~3.7~~	~~2.6~~	~~1.8~~	~~1.2~~
~~7.6~~	~~10~~	~~7.2~~	~~5.0~~	~~3.4~~	~~2.4~~	~~1.7~~	~~1.2~~	~~0.84~~
~~7.8~~	~~6.6~~	~~4.7~~	~~3.1~~	~~2.2~~	~~1.5~~	~~1.1~~	~~0.75~~	~~0.53~~
~~8.0~~	~~4.1~~	~~2.9~~	~~2.0~~	~~1.4~~	~~0.97~~	~~0.69~~	~~0.47~~	~~0.34~~
~~8.2~~	~~2.7~~	~~1.8~~	~~1.3~~	~~0.87~~	~~0.62~~	~~0.44~~	~~0.31~~	~~0.23~~
~~8.4~~	~~1.7~~	~~1.2~~	~~0.81~~	~~0.56~~	~~0.41~~	~~0.29~~	~~0.21~~	~~0.16~~
~~8.6~~	~~1.1~~	~~0.75~~	~~0.53~~	~~0.37~~	~~0.27~~	~~0.20~~	~~0.15~~	~~0.11~~
~~8.8~~	~~0.69~~	~~0.50~~	~~0.34~~	~~0.25~~	~~0.18~~	~~0.14~~	~~0.11~~	~~0.08~~
~~9.0~~	~~0.44~~	~~0.31~~	~~0.23~~	~~0.17~~	~~0.13~~	~~0.10~~	~~0.08~~	~~0.07~~

Chronic Ammonia Criteria for Saltwater

Total Ammonia (mg/l)****

Temperature (°C)

pH	0 C	5 C	10 C	15 C	20 C	25 C	30 C	35 C
Salinity = 20 g/kg								
7.0	44	30	21	14	9.7	6.6	4.7	3.1
7.2	27	19	13	9.0	6.2	4.4	3.0	2.1
7.4	18	12	8.1	5.6	4.1	2.7	1.9	1.3
7.6	11	7.5	5.3	3.4	2.5	1.7	1.2	0.84
7.8	6.9	4.7	3.4	2.3	1.6	1.1	0.78	0.53
8.0	4.4	3.0	2.1	1.5	1.0	0.72	0.50	0.34
8.2	2.8	1.9	1.3	0.94	0.66	0.47	0.31	0.24
8.4	1.8	1.2	0.84	0.59	0.44	0.30	0.22	0.16
8.6	1.1	0.78	0.56	0.41	0.28	0.20	0.15	0.12
8.8	0.72	0.50	0.37	0.26	0.19	0.14	0.11	0.08
9.0	0.47	0.34	0.24	0.18	0.13	0.10	0.08	0.07

~~Chronic Ammonia Criteria for Saltwater~~

~~Total Ammonia (mg/l)****~~

~~Temperature (°C)~~

~~pH~~	~~0 C~~	~~5 C~~	~~10 C~~	~~15 C~~	~~20 C~~	~~25 C~~	~~30 C~~	~~35 C~~
				~~Salinity = 30 g/kg~~				
~~7.0~~	~~47~~	~~31~~	~~22~~	~~15~~	~~11~~	~~7.2~~	~~5.0~~	~~3.4~~
~~7.2~~	~~29~~	~~20~~	~~14~~	~~9.7~~	~~6.6~~	~~4.7~~	~~3.1~~	~~2.2~~
~~7.4~~	~~19~~	~~13~~	~~8.7~~	~~5.9~~	~~4.1~~	~~2.9~~	~~2.0~~	~~1.4~~
~~7.6~~	~~12~~	~~8.1~~	~~5.6~~	~~3.7~~	~~3.1~~	~~1.8~~	~~1.3~~	~~0.90~~
~~7.8~~	~~7.5~~	~~5.0~~	~~3.4~~	~~2.4~~	~~1.7~~	~~1.2~~	~~0.81~~	~~0.56~~
~~8.0~~	~~4.7~~	~~3.1~~	~~2.2~~	~~1.6~~	~~1.1~~	~~0.75~~	~~0.53~~	~~0.37~~
~~8.2~~	~~3.0~~	~~2.1~~	~~1.4~~	~~1.0~~	~~0.69~~	~~0.50~~	~~0.34~~	~~0.25~~
~~8.4~~	~~1.9~~	~~1.3~~	~~0.90~~	~~0.62~~	~~0.44~~	~~0.31~~	~~0.23~~	~~0.17~~
~~8.6~~	~~1.2~~	~~0.84~~	~~0.59~~	~~0.41~~	~~0.30~~	~~0.22~~	~~0.16~~	~~0.12~~
~~8.8~~	~~0.78~~	~~0.53~~	~~0.37~~	~~0.27~~	~~0.20~~	~~0.15~~	~~0.11~~	~~0.09~~
~~9.0~~	~~0.50~~	~~0.34~~	~~0.26~~	~~0.19~~	~~0.14~~	~~0.11~~	~~0.08~~	~~0.07~~

~~*** To calculate total ammonia values at different pH's and temperature values than listed in Tables 1 and 2 use the following formulas:~~

~~Formulas Used In The Calculation of Acute Criteria Values for Ammonia In Freshwater~~

~~The one-hour average concentration of ammonia (in mg/l as un-ionized NH_3) can be calculated by using the following formulas.~~

~~0.52/FT/FPH/2 = acute criteria concentration~~

~~where; FT = final temperature~~

~~$= 10^{0.03(20-T)}$~~

~~FPH = final pH~~

~~= 1; 8.0 < pH < 9.0~~

~~= $(1 + 10^{7.4-pH})/1.25$; 6.5 < pH < 8.0~~

~~Conversions from un-ionized to total ammonia should be performed using the following formulas;~~

~~Total ammonia criteria = calculated un-ionized ammonia criteria divided by fraction of un-ionized ammonia~~

~~Where:~~

~~Fraction of un-ionized ammonia = $1/(10^{pKa-pH} + 1)$~~

~~pKa = 0.09018 + (2729.92/(273.2 + temperature °C)).~~

~~Formulas Used In The Calculation of Chronic Criteria Values for Ammonia In Freshwater~~

~~The 30-day average concentration of ammonia (in mg/l as un-ionized NH_3) can be calculated by using the following formulas.~~

~~0.80/FT/FPH/RATIO = chronic criteria concentration~~

~~where;~~

~~FT = final temperature~~

~~= $10^{0.03(20-T)}$~~

~~FPH = final pH~~

~~= 1; 8.0 < pH < 9.0~~

~~= $(1 + 10^{7.4-pH})/1.25$; 6.5 < pH < 8.0~~

~~RATIO = 13.5; 7.7 < pH < 9.0~~

~~= $20.25 \times (10^{7.7-pH})/(1 + 10^{7.4-pH})$; 6.5 < pH < 7.7~~

~~Conversions from un-ionized to total ammonia should be performed using the following formulas:~~

~~Total ammonia criteria = calculated un-ionized ammonia criteria divided by fraction of un-ionized ammonia~~

~~Where:~~

~~Fraction of un-ionized ammonia = $1/(10^{Ka-pH} + 1)$~~

~~Where pka = 0.09018 + (2729.92/(273.2 + temperature °C)).~~

~~**** To convert these values to mg/liter N, multiply by 0.822.~~

C. Application of freshwater and saltwater numerical criteria. The numerical water quality criteria listed in subsection B of this section (excluding dissolved oxygen, pH, temperature) shall be applied according to the following classes of waters (see 9 VAC 25-260-50) and boundary designations:

CLASS OF WATERS	NUMERICAL CRITERIA
I and II (Estuarine Waters)	Saltwater criteria apply
II (Transition Zone)	More stringent of either the freshwater or saltwater criteria apply
II (Tidal Freshwater), III, IV, V and VI	Freshwater criteria apply

The following describes the boundary designations for Class II, (estuarine, transition zone and tidal freshwater waters) by river basin:

1. Rappahannock Basin.

Tidal freshwater is from the fall line of the Rappahannock River to Buoy 37 near Tappahannock, Virginia, including all tidal tributaries that enter the tidal freshwater Rappahannock River.

Transition zone is from Buoy 37 to Buoy 11 near Morattico, Virginia, including all tidal tributaries that enter the transition zone of the Rappahannock River.

Estuarine waters are from Buoy 11 to the mouth of the Rappahannock River (Buoy 6), including all tidal tributaries that enter the estuarine waters of the Rappahannock River.

2. York Basin.

Tidal freshwater is from the fall line of the Mattaponi River to Clifton, Virginia, and from the fall line of the Pamunkey River to Sweet Hall Landing, Virginia, including all tidal tributaries that enter the tidal freshwaters of the Mattaponi and Pamunkey Rivers.

Transition zone of the Mattaponi River is from Clifton, Virginia to the York River and the transition zone of the Pamunkey River is from Sweet Hall Landing, Virginia, to the York River. The transition zone for the York River is from West Point, Virginia, to Buoy 13 near Poropotank Bay. All tidal tributaries that enter the transition zones of the Mattaponi, Pamunkey, and York Rivers are themselves in the transition zone.

Estuarine waters are from Buoy 13 to the mouth of the York River (Tue Marsh Light) including all tidal tributaries that enter the estuarine waters of the York River.

3. James Basin.

Tidal Freshwater is from the fall line of the James River to the confluence of the Chickahominy River (Buoy 70), including all tidal tributaries that enter the tidal freshwater James River.

Transition zone is from Buoy 70 to Buoy 47 near Jamestown Island including all tidal tributaries that enter the transition zone of the James River.

Estuarine waters are from Buoy 47 to the mouth of the James River (Buoy 25) including all tidal tributaries that enter the estuarine waters of the James River.

4. Potomac Basin.

Tidal Freshwater includes all tidal tributaries that enter the Potomac River from its fall line to Buoy 43 near Quantico, Virginia.

Transition zone includes all tidal tributaries that enter the Potomac River from Buoy 43 to Buoy 33 near Dahlgren, Virginia.

Estuarine waters includes all tidal tributaries that enter the Potomac River from Buoy 33 to the mouth of the Potomac River (Buoy 44B).

5. Chesapeake Bay, Atlantic Ocean, and small coastal basins.

Estuarine waters include the Atlantic Ocean tidal tributaries, and the Chesapeake Bay and its small coastal basins from Island), and its tidal tributaries, excluding the Potomac tributaries and those tributaries listed above.

6. Chowan River Basin.

Tidal freshwater includes the Northwest River and its tidal tributaries from the Virginia-North Carolina state line to the free flowing portion, the Blackwater River and its tidal tributaries from the Virginia-North Carolina state line to the end of tidal waters at approximately state route 611 at river mile 20.90, the Nottoway River and its tidal tributaries from the Virginia-North Carolina state line to the end of tidal waters at approximately Route 674, and the North Landing River and its tidal tributaries from the Virginia-North Carolina state line to the Great Bridge Lock.

Transition zone includes Back Bay and its tributaries in the City of Virginia Beach to the Virginia-North Carolina state line.

D. Site-specific modifications to numerical water quality criteria.

1. The board may consider site-specific modifications to numerical water quality criteria in subsection B of this section where the applicant or permittee demonstrates that the alternate

numerical water quality criteria are sufficient to protect all designated uses (see 9 VAC 25-260-10) of that particular surface water segment or body.

2. Any demonstration for site-specific human health criteria shall be restricted to a reevaluation of the bioconcentration or bioaccumulation properties of the pollutant. The exceptions to this restriction are for site-specific criteria for taste, odor, and aesthetic compounds noted by double asterisks in subsection B of this section and nitrates.

3. Site-specific temperature requirements are found in 9 VAC 25-260-90.

4. Procedures for promulgation and review of site-specific modifications to numerical water quality criteria resulting from subdivisions 1 and 2 of this subsection.

a. Proposals describing the details of the site-specific study shall be submitted to the board's staff for approval prior to commencing the study.

b. Any site-specific modification shall be promulgated as a regulation in accordance with the Administrative Process Act. All site-specific modifications shall be listed in 9 VAC 25-260-310 (Special standards and requirements).

E. Variances to water quality standards.

1. A variance from numeric criteria may be granted to a discharger if it can be demonstrated that one or more of the conditions in 9 VAC 25-260-10 G limit the attainment of one or more specific water quality criteria.

a. Variances shall apply only to the discharger to whom they are granted and shall be reevaluated and either continued, modified or revoked at the time of permit issuance. At that

time the permittee shall make a showing that the conditions for granting the variance still apply.

b. Variances shall be described in the public notice published for the permit. The decision to approve a variance shall be subject to the public participation requirements of the Virginia Pollutant Discharge Elimination System (VPDES) Permit Regulation, 9 VAC 25-31-10 et seq. (Permit Regulation).

c. Variances shall not prevent the maintenance and protection of existing uses or exempt the discharger or regulated activity from compliance with other appropriate technology or water quality-based limits or best management practices.

d. Variances granted under this section shall not apply to new discharges.

e. Variances shall be submitted by the department's Division of Scientific Research or its successors to the Environmental Protection Agency for review and approval/disapproval.

f. A list of variances granted shall be maintained by the department's Division of Scientific Research or its successors.

2. None of the variances in this subsection shall apply to the halogen ban section (9 VAC 25-260-110) or temperature criteria in 9 VAC 25-260-50 if superseded by § 316(a) of the Clean Water Act requirements. No variances in this subsection shall apply to the criteria that are designed to protect human health from carcinogenic and noncarcinogenic toxic effects (subsection B of this section) with the exception of the metals, and the taste, odor, and aesthetic compounds noted by double asterisks and nitrates, listed in subsection B of this section.

F. Water effect ratio.

1. A water effects ratio (WER) shall be determined by measuring the effect of receiving water (as it is or will be affected by any discharges) on the bioavailability or toxicity of a metal by using standard test organisms and a metal to conduct toxicity tests simultaneously in receiving water and laboratory water. The ratio of toxicities of the metal(s) in the two waters is the WER (toxicity in receiving water divided by toxicity in laboratory water = WER). Once an acceptable WER for a metal is established, the numerical value for the metal in subsection B of this section is multiplied by the WER to produce an instream concentration that will protect designated uses. This instream concentration shall be utilized in permitting decisions.

2. The WER shall be assigned a value of 1.0 unless the applicant or permittee demonstrates to the department's satisfaction in a permit proceeding that another value is appropriate, or unless available data allow the department to compute a WER for the receiving waters. The applicant or permittee is responsible for proposing and conducting the study to develop a WER. The study may require multiple testing over several seasons. The applicant or permittee shall obtain the department's Division of Scientific Research or its successor approval of the study protocol and the final WER.

3. The Permit Regulation at 9 VAC 25-31-230 C requires that permit limits for metals be expressed as total recoverable measurements. To that end, the study used to establish the WER may be based on total recoverable measurements of the metals.

4. The Environmental Protection Agency views the WER in any particular case as a site-specific criterion. Therefore, the department's Division of Scientific Research or its successor shall submit the results of the study to the Environmental Protection Agency for review and

approval/disapproval within 30 days of the receipt of certification from the state's Office of the Attorney General. Nonetheless, the WER is established in a permit proceeding, shall be described in the public notice associated with the permit proceeding, and applies only to the applicant or permittee in that proceeding. The department's action to approve or disapprove a WER is a case decision, not an amendment to the present regulation.

The decision to approve or disapprove a WER shall be subject to the public participation requirements of the Permit Regulation, 9 VAC 25-31-260 et seq. A list of final WERs will be maintained by the department's Division of Scientific Research or its successor.

5. A WER shall not be used for the freshwater and saltwater chronic mercury criteria or the freshwater acute and chronic selenium criteria.

9 VAC 25-260-155. Ammonia surface water quality criteria.

A. The one-hour average concentration of total ammonia nitrogen (in mg N/L) in freshwater shall not exceed, more than once every three years on the average[1], the acute criteria below:

Acute Ammonia Freshwater Criteria

Total Ammonia Nitrogen (mg N/L)

pH	Trout Present	Trout Absent
6.5	32.6	48.8
6.6	31.3	46.8
6.7	29.8	44.6
6.8	28.1	42.0
6.9	26.2	39.1
7.0	24.1	36.1
7.1	22.0	32.8
7.2	19.7	29.5
7.3	17.5	26.2
7.4	15.4	23.0
7.5	13.3	19.9
7.6	11.4	17.0
7.7	9.65	14.4
7.8	8.11	12.1
7.9	6.77	10.1
8.0	5.62	8.40
8.1	4.64	6.95
8.2	3.83	5.72
8.3	3.15	4.71

8.4	2.59	3.88
8.5	2.14	3.20
8.6	1.77	2.65
8.7	1.47	2.20
8.8	1.23	1.84
8.9	1.04	1.56
9.0	0.885	1.32

The acute criteria for trout present shall apply to all Class V -Stockable Trout Waters and Class VI-Natural Trout Waters as listed in sections 9 VAC 25-260-390 et seq.

To calculate total ammonia nitrogen acute criteria values in freshwater at different pH values than those listed in this subsection, use the following formulas:

Where trout are present:

$$\text{Acute Criterion Concentration (mg N/L)} = 0.275/(1 + 10^{7.204-pH}) + 39.0/(1 + 10^{pH-7.204})$$

Or where trout are absent:

$$\text{Acute Criterion Concentration (mg N/L)} = 0.411/(1 + 10^{7.204-pH}) + 58.4/(1 + 10^{pH-7.204})$$

[1]The default design flow for calculating steady state waste load allocations for the acute ammonia criterion is the 1Q10 (see 9 VAC 25-260-140 B footnote 10) unless statistically valid methods are employed which demonstrate compliance with the duration and return frequency of the water quality criteria.

B. The thirty-day average concentration of total ammonia nitrogen (in mg N/L) where early life stages of fish are present in freshwater shall not exceed, more than once every three years on the average[2], the chronic criteria below:

Chronic Ammonia Freshwater Criteria

Early Life Stages of Fish Present

Total Ammonia Nitrogen (mg N/L)

pH	Temperature (°C)									
	0	14	16	18	20	22	24	26	28	30
6.5	6.67	6.67	6.06	5.33	4.68	4.12	3.62	3.18	2.80	2.46
6.6	6.57	6.57	5.97	5.25	4.61	4.05	3.56	3.13	2.75	2.42
6.7	6.44	6.44	5.86	5.15	4.52	3.98	3.50	3.07	2.70	2.37
6.8	6.29	6.29	5.72	5.03	4.42	3.89	3.42	3.00	2.64	2.32
6.9	6.12	6.12	5.56	4.89	4.30	3.78	3.32	2.92	2.57	2.25
7.0	5.91	5.91	5.37	4.72	4.15	3.65	3.21	2.82	2.48	2.18
7.1	5.67	5.67	5.15	4.53	3.98	3.50	3.08	2.70	2.38	2.09
7.2	5.39	5.39	4.90	4.31	3.78	3.33	2.92	2.57	2.26	1.99
7.3	5.08	5.08	4.61	4.06	3.57	3.13	2.76	2.42	2.13	1.87
7.4	4.73	4.73	4.30	3.78	3.32	2.92	2.57	2.26	1.98	1.74
7.5	4.36	4.36	3.97	3.49	3.06	2.69	2.37	2.08	1.83	1.61
7.6	3.98	3.98	3.61	3.18	2.79	2.45	2.16	1.90	1.67	1.47
7.7	3.58	3.58	3.25	2.86	2.51	2.21	1.94	1.71	1.50	1.32
7.8	3.18	3.18	2.89	2.54	2.23	1.96	1.73	1.52	1.33	1.17
7.9	2.80	2.80	2.54	2.24	1.96	1.73	1.52	1.33	1.17	1.03
8.0	2.43	2.43	2.21	1.94	1.71	1.50	1.32	1.16	1.02	0.897
8.1	2.10	2.10	1.91	1.68	1.47	1.29	1.14	1.00	0.879	0.773
8.2	1.79	1.79	1.63	1.43	1.26	1.11	0.973	0.855	0.752	0.661
8.3	1.52	1.52	1.39	1.22	1.07	0.941	0.827	0.727	0.639	0.562

8.4	1.29	1.29	1.17	1.03	0.906	0.796	0.700	0.615	0.541	0.475
8.5	1.09	1.09	0.990	0.870	0.765	0.672	0.591	0.520	0.457	0.401
8.6	0.920	0.920	0.836	0.735	0.646	0.568	0.499	0.439	0.386	0.339
8.7	0.778	0.778	0.707	0.622	0.547	0.480	0.422	0.371	0.326	0.287
8.8	0.661	0.661	0.601	0.528	0.464	0.408	0.359	0.315	0.277	0.244
8.9	0.565	0.565	0.513	0.451	0.397	0.349	0.306	0.269	0.237	0.208
9.0	0.486	0.486	0.442	0.389	0.342	0.300	0.264	0.232	0.204	0.179

To calculate total ammonia nitrogen chronic criteria values in freshwater when fish early life stages are present at different pH and temperature values than those listed in this subsection, use the following formulas:

$$\text{Chronic Criteria Concentration} = \left(0.0577/(1 + 10^{7.688-pH}) + 2.487/(1 + 10^{pH-7.688})\right) \times \text{MIN}$$

Where MIN = 2.85 or $1.45 \times 10^{0.028(25-T)}$, whichever is less.

[2] The default design flow for calculating steady state waste load allocations for the chronic ammonia criterion where early life stages of fish are present is the 30Q10 (see 9 VAC 25-260-140 B footnote 10) unless statistically valid methods are employed which demonstrate compliance with the duration and return frequency of the water quality criteria.

C. The thirty-day average concentration of total ammonia nitrogen (in mg N/L) where early life stages of fish are absent (procedures for making this determination are in subdivision 9 VAC 25-260-155 C 1 - 4), in freshwater shall not exceed, more than once every three years on the average[3], the chronic criteria below:

Chronic Ammonia Freshwater Criteria

Early Life Stages of Fish Absent

Total Ammonia Nitrogen (mg N/L)

	Temperature (C^o)									
pH	0-7	8	9	10	11	12	13	14	15	16
6.5	10.8	10.1	9.51	8.92	8.36	7.84	7.35	6.89	6.46	6.06
6.6	10.7	9.99	9.37	8.79	8.24	7.72	7.24	6.79	6.36	5.97
6.7	10.5	9.81	9.20	8.62	8.08	7.58	7.11	6.66	6.25	5.86
6.8	10.2	9.58	8.98	8.42	7.90	7.40	6.94	6.51	6.10	5.72
6.9	9.93	9.31	8.73	8.19	7.68	7.20	6.75	6.33	5.93	5.56
7.0	9.60	9.00	8.43	7.91	7.41	6.95	6.52	6.11	5.73	5.37
7.1	9.20	8.63	8.09	7.58	7.11	6.67	6.25	5.86	5.49	5.15
7.2	8.75	8.20	7.69	7.21	6.76	6.34	5.94	5.57	5.22	4.90
7.3	8.24	7.73	7.25	6.79	6.37	5.97	5.60	5.25	4.92	4.61
7.4	7.69	7.21	6.76	6.33	5.94	5.57	5.22	4.89	4.59	4.30
7.5	7.09	6.64	6.23	5.84	5.48	5.13	4.81	4.51	4.23	3.97
7.6	6.46	6.05	5.67	5.32	4.99	4.68	4.38	4.11	3.85	3.61
7.7	5.81	5.45	5.11	4.79	4.49	4.21	3.95	3.70	3.47	3.25
7.8	5.17	4.84	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89
7.9	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89	2.71	2.54
8.0	3.95	3.70	3.47	3.26	3.05	2.86	2.68	2.52	2.36	2.21
8.1	3.41	3.19	2.99	2.81	2.63	2.47	2.31	2.17	2.03	1.91
8.2	2.91	2.73	2.56	2.40	2.25	2.11	1.98	1.85	1.74	1.63

8.3	2.47	2.32	2.18	2.04	1.91	1.79	1.68	1.58	1.48	1.39
8.4	2.09	1.96	1.84	1.73	1.62	1.52	1.42	1.33	1.25	1.17
8.5	1.77	1.66	1.55	1.46	1.37	1.28	1.20	1.13	1.06	0.990
8.6	1.49	1.40	1.31	1.23	1.15	1.08	1.01	0.951	0.892	0.836
8.7	1.26	1.18	1.11	1.04	0.976	0.915	0.858	0.805	0.754	0.707
8.8	1.07	1.01	0.944	0.885	0.829	0.778	0.729	0.684	0.641	0.601
8.9	0.917	0.860	0.806	0.756	0.709	0.664	0.623	0.584	0.548	0.513
9.0	0.790	0.740	0.694	0.651	0.610	0.572	0.536	0.503	0.471	0.442

At 15°C and above, the criterion for fish early life stages absent is the same as the criterion for fish early life stages present.

To calculate total ammonia nitrogen chronic criteria values in freshwater when fish early life stages are absent at different pH and temperature values than those listed in this subsection, use the following formulas:

$$\text{Chronic Criteria Concentration} = \left(0.0577/(1 + 10^{7.688-pH}) + 2.487/(1 + 10^{pH-7.688})\right) \times 1.45(10^{0.028(25-MAX)})$$

MAX = temperature in ° C or 7, whichever is greater.

[3]The default design flow for calculating steady state waste load allocations for the chronic ammonia criterion where early life stages of fish are absent is the 30Q10 (see 9 VAC 25-260-140 B footnote 10), unless statistically valid methods are employed which demonstrate compliance with the duration and return frequency of the water quality criteria.

1. Site-specific modifications to the ambient water quality criteria for ammonia to account for the absence of early life stages of fish shall be conducted in accordance with the procedures contained in this subdivision. Because the Department presumes that most state waterbodies have early life stages of fish present during most times of the year, the

criteria shall be calculated assuming early life stages of fish are present using 9 VAC 25-260-155 B unless the following demonstration that early life stages are absent is successfully completed. Early life stages of fish are defined in subdivision C 2 of this section. Modifications to the ambient water quality criteria for ammonia based on the presence or absence of early life stages of fish shall only apply at temperatures below 15°C.

a. During the review of any new or existing activity that has a potential to discharge ammonia in amounts that may cause or contribute to a violation of the ammonia criteria contained in subsection B of this section, the Department may examine data from the following approved sources in 9 VAC 25-260-155 C 1 a (1)-(5) or may require the gathering of data in accordance with 9 VAC 25-260-155 C 1 a (1)-(5) on the presence or absence of early life stages of fish in the affected waterbody.

(1) Species and distribution data contained in the Virginia Department of Game and Inland Fisheries Wildlife Information System database.

(2) Species and distribution data contained in *Freshwater Fishes of Virginia,*1994 or later editions.

(3) Data and fish species distribution maps contained in *Handbook for Fishery Biologist, Volumes 1-5,* 1998 or later editions.

(4) Field data collected in accordance with U.S. EPA's *Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers, July* 1999 or later edition. Field data must comply with all quality assurance/quality control criteria.

(5) *The American Society for Testing and Materials (ASTM) Standard E-1241, Standard Guide for Conducting Early Life-Stage Toxicity Tests with Fishes.*

b. If data or information from sources other than 9 VAC 25-260-155 C 1 a (1)-(5) are considered, then any resulting site-specific criteria modifications shall be reviewed and adopted in accordance with the site-specific criteria provisions in section 9 VAC 25-260-140 subsection D, and submitted to EPA for review and approval.

c. If the Department determines that the data and information obtained from 9 VAC 25-260-155 C 1 a (1)-(5) demonstrate that there are periods of each year when no early life stages are expected to be present for any species of fish that occur at the site, the Department shall issue a notice to the public and make available for public comment the supporting data and analysis along with the Department's preliminary decision to authorize the site-specific modification to the ammonia criteria. Such information shall include, at a minimum:

(1) Sources of data and information.

(2) List of fish species that occur at the site as defined by subsection C 3 of this section.

(3) Definition of the site. Definition of a "site" can vary in geographic size from a stream segment to a watershed to an entire eco-region.

(4) Duration of early life stage for each species in subdivision C 1 c (2) of this section.

(5) Dates when early life stages of fish are expected to be present for each species in subdivision C 1 c (2) of this section.

(6) Based on (5), identify the dates (beginning date, ending date), if any, where no early life stages are expected to be present for any of the species identified in subdivision C 1 c (2) of this section.

d. If, after reviewing the public comments received in section 9 VAC 25-260-155 C 1 c and supporting data and information, the Department determines that there are times of the year where no early life stages are expected to be present for any fish species that occur at the site, then the applicable ambient water quality criteria for ammonia for those time periods shall be calculated using the table in subsection C or the formula for calculating the chronic criterion concentration for ammonia when fish early life stages are absent.

e. The Department shall maintain a comprehensive list of all sites where the Department has determined that early life stages of fish are absent. For each site the list will identify the waterbodies affected and the corresponding times of the year that early life stages are

absent. This list is available either upon request from the Office of Water Quality Programs at 629 E. Main Street, Richmond, VA, 23219 or from the Department website http://deq.state.va.us/wqs/ .

2. The duration of the "early life stages" extends from the beginning of spawning through the end of the early life stages. The early life stages include the pre-hatch embryonic period, the post-hatch free embryo or yolk-sac fry, and the larval period, during which the organism feeds. Juvenile fish, which are anatomically similar to adults, are not considered an early life stage. The duration of early life stages can vary according to fish species. The Department considers the sources of information in subdivisions C 1 a (1)-(5) to be the only acceptable sources of information for determining the duration of early life stages of fish under this procedure.

3. "Occur at the site" includes the species, genera, families, orders, classes, and phyla that: are usually present at the site; are present at the site only seasonally due to migration; are present intermittently because they periodically return to or extend their ranges into the site; were present at the site in the past or are present in nearby bodies of water, but are not currently present at the site due to degraded conditions, and are expected to return to the site when conditions improve. Occur at the site does not include taxa that were once present at the site but cannot exist at the site now due to permanent physical alteration of the habitat at the site.

4. Any modifications to ambient water quality criteria for ammonia in subsection C 1 of this section shall not likely jeopardize the continued existence of any federally listed, threatened or endangered species or result in the destruction or adverse modification of such species' critical habitat.

D. The one-hour average concentration of total ammonia nitrogen (in mg N/L) in saltwater shall not exceed, more than once every three years on the average, the acute criteria below:

Acute Ammonia Saltwater Criteria

Total Ammonia Nitrogen (mg N/L)

Salinity = 10 g/kg

	Temperature º C							
	0	5	10	15	20	25	30	35
pH								
7.00	231.9	159.8	110.1	75.88	52.31	36.08	24.91	17.21
7.20	146.4	100.9	69.54	47.95	33.08	22.84	15.79	10.93
7.40	92.45	63.73	43.94	30.32	20.94	14.48	10.03	6.97
7.60	58.40	40.28	27.80	19.20	13.28	9.21	6.40	4.47
7.80	36.92	25.48	17.61	12.19	8.45	5.88	4.11	2.89
8.00	23.37	16.15	11.18	7.76	5.40	3.78	2.66	1.89
8.20	14.81	10.26	7.13	4.97	3.48	2.46	1.75	1.27
8.40	9.42	6.54	4.57	3.20	2.27	1.62	1.18	0.87
8.60	6.01	4.20	2.95	2.09	1.50	1.09	0.81	0.62
8.80	3.86	2.72	1.93	1.39	1.02	0.76	0.58	0.46
9.00	2.51	1.79	1.29	0.95	0.71	0.55	0.44	0.36

Salinity = 20 g/kg

	Temperature º C							
	0	5	10	15	20	25	30	35
pH								
7.00	247.6	170.5	117.5	80.98	55.83	38.51	26.58	18.36
7.20	156.3	107.7	74.21	51.17	35.30	24.37	16.84	11.66
7.40	98.67	68.01	46.90	32.35	22.34	15.44	10.70	7.43

7.60	62.33	42.98	29.66	20.48	14.17	9.82	6.82	4.76
7.80	39.40	27.19	18.78	13.00	9.01	6.26	4.37	3.07
8.00	24.93	17.23	11.92	8.27	5.76	4.02	2.83	2.01
8.20	15.80	10.94	7.59	5.29	3.70	2.61	1.86	1.34
8.40	10.04	6.97	4.86	3.41	2.41	1.72	1.24	0.91
8.60	6.41	4.47	3.14	2.22	1.59	1.15	0.85	0.65
8.80	4.11	2.89	2.05	1.47	1.07	0.80	0.61	0.48
9.00	2.67	1.90	1.36	1.00	0.75	0.57	0.46	0.37

Salinity = 30 g/kg

Temperature º C

pH	0	5	10	15	20	25	30	35
7.00	264.6	182.3	125.6	86.55	59.66	41.15	28.39	19.61
7.20	167.0	115.1	79.31	54.68	37.71	26.03	17.99	12.45
7.40	105.5	72.68	50.11	34.57	23.87	16.50	11.42	7.92
7.60	66.61	45.93	31.69	21.88	15.13	10.48	7.28	5.07
7.80	42.10	29.05	20.07	13.88	9.62	6.68	4.66	3.27
8.00	26.63	18.40	12.73	8.83	6.14	4.29	3.01	2.13
8.20	16.88	11.68	8.10	5.64	3.94	2.78	1.97	1.42
8.40	10.72	7.44	5.18	3.63	2.56	1.82	1.31	0.96
8.60	6.83	4.77	3.34	2.36	1.69	1.22	0.90	0.68
8.80	4.38	3.08	2.18	1.56	1.13	0.84	0.64	0.50
9.00	2.84	2.01	1.45	1.06	0.79	0.60	0.47	0.39

To calculate total ammonia nitrogen acute criteria values in saltwater at different pH and temperature values than those listed in this subsection, use the following formulas:

I = 19.0273S/(1000-1.005109S)

Where I = molal ionic strength of water

S = Salinity ppt (g/kg)

The regression model used to relate I to pKa (negative log of the ionization constant) is

pKa = 9.245 + .138I

pKa as defined by these equations is at 298 degrees Kelvin (25°C). To correct for other temperatures:

$pKa^{S}_{T} = pKa^{S}_{298} + .0324(298 - T\ ^\circ \text{Kelvin})$

T ° Kelvin = ° C + 273.15

The unionized ammonia fraction (UIA) is given by:

$$UIA = \frac{1}{1+10^{(pKa^{S}_{T} - pH)}}$$

The acute ammonia criterion in saltwater is given by:

$$Acute = \frac{.233}{UIA}$$

Multiply the above value by .822 to get the ammonia-N acute criterion.

E. The thirty-day average concentration of total ammonia nitrogen (in mg N/L) in saltwater shall not exceed, more than once every three years on the average, the chronic criteria below:

Chronic Ammonia Saltwater Criteria

Total Ammonia Nitrogen (mg N/L)

Salinity = 10 g/kg

	Temperature º C							
pH	0	5	10	15	20	25	30	35
7.00	34.84	24.00	16.54	11.40	7.86	5.42	3.74	2.59
7.20	21.99	15.15	10.45	7.20	4.97	3.43	2.37	1.64
7.40	13.89	9.57	6.60	4.55	3.15	2.18	1.51	1.05
7.60	8.77	6.05	4.18	2.88	2.00	1.38	0.96	0.67
7.80	5.55	3.83	2.65	1.83	1.27	0.88	0.62	0.43
8.00	3.51	2.43	1.68	1.17	0.81	0.57	0.40	0.28
8.20	2.23	1.54	1.07	0.75	0.52	0.37	0.26	0.19
8.40	1.41	0.98	0.69	0.48	0.34	0.24	0.18	0.13
8.60	0.90	0.63	0.44	0.31	0.23	0.16	0.12	0.09
8.80	0.58	0.41	0.29	0.21	0.15	0.11	0.09	0.07
9.00	0.38	0.27	0.19	0.14	0.11	0.08	0.07	0.05

Salinity = 20 g/kg

pH	Temperature º C							
	0	5	10	15	20	25	30	35
7.00	37.19	25.62	17.65	12.16	8.39	5.78	3.99	2.76
7.20	23.47	16.17	11.15	7.69	5.30	3.66	2.53	1.75
7.40	14.82	10.22	7.04	4.86	3.36	2.32	1.61	1.12
7.60	9.36	6.46	4.46	3.08	2.13	1.47	1.02	0.71
7.80	5.92	4.08	2.82	1.95	1.35	0.94	0.66	0.46
8.00	3.74	2.59	1.79	1.24	0.86	0.60	0.43	0.30
8.20	2.37	1.64	1.14	0.79	0.56	0.39	0.28	0.20
8.40	1.51	1.05	0.73	0.51	0.36	0.26	0.19	0.14
8.60	0.96	0.67	0.47	0.33	0.24	0.17	0.13	0.10
8.80	0.62	0.43	0.31	0.22	0.16	0.12	0.09	0.07
9.00	0.40	0.28	0.20	0.15	0.11	0.09	0.07	0.06

Salinity = 30 g/kg

pH	Temperature º C							
	0	5	10	15	20	25	30	35
7.00	39.75	27.38	18.87	13.00	8.96	6.18	4.27	2.95
7.20	25.09	17.29	11.91	8.21	5.67	3.91	2.70	1.87
7.40	15.84	10.92	7.53	5.19	3.59	2.48	1.72	1.19
7.60	10.01	6.90	4.76	3.29	2.27	1.57	1.09	0.76
7.80	6.32	4.36	3.01	2.08	1.44	1.00	0.70	0.49
8.00	4.00	2.76	1.91	1.33	0.92	0.64	0.45	0.32
8.20	2.53	1.75	1.22	0.85	0.59	0.42	0.30	0.21

8.40	1.61	1.12	0.78	0.55	0.38	0.27	0.20	0.14
8.60	1.03	0.72	0.50	0.35	0.25	0.18	0.14	0.10
8.80	0.66	0.46	0.33	0.23	0.17	0.13	0.10	0.08
9.00	0.43	0.30	0.22	0.16	0.12	0.09	0.07	0.06

To calculate total ammonia nitrogen acute criteria values in saltwater at different pH and temperature values than those listed in this subsection, use the following formulas:

$I = 19.0273S/(1000-1.005109S)$

Where I = molal ionic strength of water

S = Salinity ppt (g/kg)

The regression model used to relate I to pKa (negative log of the ionization constant) is

$pKa = 9.245 + .138I$

pKa as defined by these equations is at 298 degrees Kelvin (25°C). To correct for other temperatures:

$pKa^{S}_{T} = pKa^{S}_{298} + .0324(298 - T\ ° Kelvin)$

$T\ ° Kelvin = °\ C + 273.15$

The unionized ammonia fraction (UIA) is given by:

$$UIA = \frac{1}{1+10^{(pKa^{S}_{T} - pH)}}$$

The chronic ammonia criterion is saltwater is given by:

$$Chronic = \frac{.035}{UIA}$$

Multiply the above value by .822 to get the ammonia-N chronic criterion.

PART II

STANDARDS WITH MORE SPECIFIC APPLICATION

9 VAC 25-260-160. Fecal coliform bacteria; shellfish waters.

In all open ocean or estuarine waters capable of propagating shellfish or in specific areas where public or leased private shellfish beds are present, and including those waters on which condemnation or restriction classifications are established by the State Department of Health, the following criteria for fecal coliform bacteria shall apply:

The ~~median~~ geometric mean fecal coliform value for a sampling station shall not exceed an MPN (most probable number) of 14 per 100 milliliters. ~~Not more than 10% of samples shall~~ The 90th percentile shall not exceed an MPN of 43 for a 5-tube, 3-dilution test or 49 for a 3-tube, 3-dilution test.

9 VAC 25-260-170. ~~Fecal coliform~~ Bacteria ; other waters.

A. ~~General requirements~~ In ~~all~~ surface waters, except shellfish waters and certain waters ~~addressed~~ identified in subsection B of this section, the following criteria shall apply to protect primary contact recreational uses:

1. ~~the~~ Fecal coliform bacteria shall not exceed a geometric mean of 200 fecal coliform bacteria per 100 ml of water for two or more samples over a ~~30-day period, or a fecal coliform bacteria level of 1,000 per 100 ml at any time.~~ calendar month nor shall more than 10 percent of the total samples taken during any calendar month exceed 400 fecal coliform bacteria per 100 ml of water. This criterion shall not apply for a sampling station after the bacterial indicators

described in subdivision 2 below have a minimum of 12 data points or after June 30, 2008, whichever comes first.

2. *E. coli* and enterococci bacteria per 100 ml of water shall not exceed the following:

	Geometric Mean[1]	Single Sample Maximum[2]
Fresh and Transition Zone Waters[3]		
enterococci	33	61
E.coli	126	235
Saltwater		
enterococci	35	104

[1] Calendar month average for two or more samples.

[2] No single sample maximum for enterococci and *E. coli* shall exceed a 75% upper one-sided confidence limit based on a site-specific log standard deviation. If site data are insufficient to establish a site-specific log standard deviation, then 0.4 shall be used as the log standard deviation in fresh and transition zone waters and 0.7 shall be as the log standard deviation in saltwater. Values shown are based on a log standard deviation of 0.4 in freshwater and 0.7 in saltwater.

[3] See subsection 9 VAC 25-260-140 C for fresh and transition zone waters delineation.

B. ~~Disinfection policy.~~ Notwithstanding the above, all ~~in waters that receive~~ sewage discharges~~,~~ ~~all the designated uses in these waters shall be protected~~ shall be disinfected to achieve the applicable bacteria concentrations in 9 VAC 25-260-170 A prior to discharge. ~~The board's disinfection policy applies to these waters.~~

~~1. Sewage discharges in relation to water supply intakes. Discharges located within 15 miles upstream or one tidal cycle downstream of a water supply intake shall be disinfected in order to achieve a fecal coliform geometric mean value in the effluent equal to or less than 200 per 100 milliliters.~~

~~**2.** Sewage discharges into shellfish waters. When sewage discharges are permitted to or within five miles upstream of shellfish waters, they shall be disinfected in order to achieve a fecal coliform geometric mean value in the effluent equal to or less than 200 per 100 milliliters.~~

~~**3.** Sewage discharges into other waters. Sewage discharges into other waters shall be adequately treated and disinfected as necessary to protect all the designated uses in these waters. Generally, these discharges shall achieve a fecal coliform geometric mean value in the effluent equal to or less than 200 per 100 milliliters.~~

However, the board, with the advice of the State Department of Health, may determine that reduced or no disinfection of a discharge is appropriate on a seasonal or year-round basis. In making such a determination, the board shall consider the designated uses of these waters and the seasonal nature of those uses. Such determinations will be made during the process of approving, issuing, or reissuing the discharge permit and shall be in conformance with a board approved site-specific use-attainability analysis performed by the permittee. When making a

case-by-case determination concerning the appropriate level of disinfection for sewage discharges into these waters, the board shall provide a 45-day public notice period and opportunity for a public hearing.

9 VAC 25-260-310. Special standards and requirements.

The special standards are shown in small letters to correspond to lettering in the basin tables. The special standards are as follows:

a. Shellfish waters. In all open ocean or estuarine waters capable of propagating shellfish or in specific areas where public or leased private shellfish beds are present, including those waters on which condemnation or restriction classifications are established by the State Department of Health, the following criteria for fecal coliform bacteria will apply:

The median fecal coliform value for a sampling station shall not exceed an MPN of 14 per 100 ml of sample and not more than 10% of samples shall exceed 43 for a 5-tube, 3-dilution test or 49 for a 3-tube, 3-dilution test.

The shellfish area is not to be so contaminated by radionuclides, pesticides, herbicides, or fecal material that the consumption of shellfish might be hazardous.

b. Policy for the Potomac Embayments. At its meeting on September 12, 1996, the board adopted a policy (9 VAC 25-415-10 et seq. Policy for the Potomac Embayments) to control point source discharges of conventional pollutants into the Virginia embayment waters of the Potomac River, and their tributaries, from the fall line at Chain Bridge in Arlington County to the Route 301 bridge in King George County. The policy sets effluent limits for BOD_5, total suspended solids, phosphorus, and ammonia, to protect the water quality of these high profile waterbodies.

c. Cancelled.

d. Aquia Creek. No proposal resulting in the discharge of treated wastes to Aquia Creek will be approved unless the following is provided:

(1) At least 100 days' storage to allow complete elimination of discharges during the low-flow summer months; or

(2) Other treatment, based on sound engineering concepts (preferably with experimental data to show their feasibility), for nutrient removal prior to discharge.

e. Cancelled.

f. Cancelled.

g. Occoquan watershed policy. At its meeting on July 26, 1971 (Minute 10), the board adopted a comprehensive pollution abatement and water quality management policy for the Occoquan watershed. The policy set stringent treatment and discharge requirements in order to improve and protect water quality, particularly since the waters are an important water supply for Northern Virginia. Following a public hearing on November 20, 1980, the board, at its December 10-12, 1980, meeting, adopted as of February 1, 1981, revisions to this policy (Minute 20). These revisions became effective March 4, 1981. Additional amendments were made following a public hearing on August 22, 1990, and adopted by the board at its September 24, 1990, meeting (Minute 24) and became effective on December 5, 1990. Copies are available upon request from the Department of Environmental Quality.

h. Cancelled.

i. Cancelled.

j. Cancelled.

k. Cancelled.

l. Cancelled.

m. The following effluent standards apply to the entire Chickahominy watershed above Walker's Dam:

CONSTITUENT	CONCENTRATION
1. Biochemical Oxygen demand 5-day at 20°	6.0 mg/l monthly average, with not more than 5% of individual samples to exceed 8.0 mg/l
2. Settleable Solids	Not to exceed 0.1 ml/l
3. Suspended Solids	5.0 mg/l monthly average, with not more than 5% of individual samples to exceed 7.5 mg/l
4. Ammonia Nitrogen	Not to exceed 2.0 mg/l as N
5. Total Phosphorus	Not to exceed 0.1 mg/l monthly average for all discharges with the exception of Holly Farms Poultry Industries, Inc. which shall meet 0.3 mg/l monthly average and 0.5 mg/l daily maximum.

6. Other Physical and Chemical Constituents	Other physical or chemical constituents not specifically mentioned will be covered by additional specifications as conditions detrimental to the stream arise. The specific mention of items 1 through 5 does not necessarily mean that the addition of other physical or chemical constituents will be condoned.

n. No sewage discharges, regardless of degree of treatment, should be allowed into the James River between Bosher and Williams Island Dams.

o. The concentration and total amount of impurities in Tuckahoe Creek and its tributaries of sewage origin shall be limited to those amounts from sewage, industrial wastes, and other wastes which are now present in the stream from natural sources and from existing discharges in the watershed.

p. Cancelled.

q. Rappahannock River Basin.

The following effluent standards (adopted in Minute 17 from the proceedings of the board at its meeting on September 17-18, 1972) apply to all waste discharges to the Rappahannock River Basin above the proposed Salem Church Dam in accordance with subdivisions (1) and (2) below:

CONSTITUENT	FINAL EFFLUENT REQUIREMENTS (WEEKLY AVERAGE)
BOD - mg/l	1
COD - mg/l	10
Suspended solids - mg/l	0 (unmeasurable)
MBAS - mg/l	0.1
Turbidity (Jackson Units)	0.4
Fecal Coliform Bacteria per 100 ml sample	Less than 2
Nitrogen - mg/l	1
Phosphorus - mg/l	0.1

(1) After the date of Congressional authorization for actual construction of the dam has been given, all new proposals shall comply fully with the adopted standards of the paragraph above and all existing owners shall immediately commence the necessary planning, financing and design to ensure that facilities are completed prior to final completion of the construction of the dam; and

(2) Any new proposals for waste discharges to the area encompassed by the standards shall provide such conventional treatment that in the opinion of the State Department of Health, the staff and the board, satisfactory advanced waste treatment units can readily be added when funds for construction of the Salem Church Dam have been authorized.

r. Cancelled.

s. Chlorides not to exceed 40 mg/l at any time.

t. Cancelled.

u. Maximum temperature for the New River Basin from West Virginia state line upstream to the Giles - Montgomery County line:

The maximum temperature shall be 27°C (81°F) unless caused by natural conditions; the maximum rise above natural temperatures shall not exceed 2.8°C (5°F).

This maximum temperature limit of 81°F was established in the 1970 water quality standards amendments so that Virginia temperature criteria for the New River would be consistent with those of West Virginia, since the stream flows into that state.

v. The maximum temperature of the New River and its tributaries (except trout waters) from the Montgomery-Giles County line upstream to the Virginia-North Carolina state line shall be 29°C (84°F).

w. Cancelled.

x. Clinch River from the confluence of Dumps Creek at river mile 268 at Carbo downstream to river mile 255.4. The special water quality criteria for copper (measured as total recoverable) in this section of the Clinch River are 12.4 µg/l for protection from chronic effects and 19.5 µg/l for protection from acute effects. These site-specific criteria are needed to provide protection to several endangered species of freshwater mussels.

y. Tidal freshwater Potomac River and tributaries that enter the tidal freshwater Potomac River from Cockpit Point (below Occoquan Bay) to the fall line at Chain Bridge. During November 1 through February 14 of each year the chronic ammonia criterion for early life stage of fish absent shall apply (see section 9 VAC 25-260-155 C). This special standard is adopted in accordance with 9 VAC 5-260-155 C 1 b.

9 VAC25-260-390. Potomac River Basin. Potomac River Subbasin

SEC.	CLASS	SP. STDS.	SECTION DESCRIPTION
1	II	a	Tidal tributaries of the Potomac River from Smith Point to Upper Machodoc Creek (Baber Point).
1a	III		All free flowing portions of tributaries to the Potomac River from Smith Point to the Route 301 Bridge in King George County unless otherwise designated in this chapter.
1b	III	b,NEW-12	All free flowing portions of tributaries to the Potomac River from the Route 301 Bridge in King George County to, and including, Potomac Creek, unless otherwise designated in this chapter.
1c	III	PWS,b,NEW-12	Potomac Creek and its tributaries from the Stafford County water supply dam (Able Lake Reservoir) to their headwaters.
2	II	a,NEW-14	Tidal Upper Machodoc Creek and the tidal portions of its tributaries.
2a	III	NEW-14	Free flowing portions of Upper Machodoc Creek and its tributaries.
3	II	b,NEW-12	Tidal portions of the tributaries to the Potomac

			River from the Route 301 Bridge in King George County to Marlboro Point.
4	II	b,d,NEW-6	Tidal portions of the tributaries to the Potomac River from Marlboro Point to Brent Point (to include Aquia Creek and its tributaries).
4a	III	b,d,NEW-6	Free flowing portions of tributaries to the Potomac River in Section 4 up to the Aquia Sanitary District Water Impoundment.
4b	III	PWS,b,d,NEW-6	Aquia Creek from the Aquia Sanitary District Water Impoundment, and other tributaries into the impoundment, including Beaverdam Run and the Lunga Reservoir upstream to their headwaters.
5	II	b	Tidal portions of tributaries to the Potomac River from Brent Point to Shipping Point, including tidal portions of Chopawamsic Creek and its tidal tributaries.
5a	III	b	Free flowing portions of Chopawamsic Creek and its tributaries to Quantico Marine Base water supply dam.
5b	III	PWS,b	Chopawamsic Creek and its tributaries above the Quantico Marine Base water supply intakes

			at the Gray and Breckenridge Reservoirs to their headwaters.
6	II	b,y,NEW-7,8,9,10,11,13	Tidal portions of tributaries to the Potomac River from Shipping Point to Chain Bridge.
7	III	b,NEW-7,8,9,10,11,13	Free flowing portions of tributaries to the Potomac River from Shipping Point to Chain Bridge, unless otherwise designated in this chapter.
7a	III	g	Occoquan River and its tributaries to their headwaters above Fairfax County Water Authority's water supply impoundment, unless otherwise designated in this chapter.
7b	III	PWS,g	The impounded waters of Occoquan River above the water supply dam of the Fairfax County Water Authority to backwater of the impoundment on Bull Run and Occoquan River, and the tributaries of Occoquan above the dam to a point 5 miles above the dam.
7c	III	PWS,g	Broad Run and its tributaries above the water supply dam of the City of Manassas upstream to a point 5 miles above the dam.
7d	III	PWS,g	The impounded waters of Lake Jackson, Broad

			Run, and Cedar Run.
7e	III	PWS,g	Cedar Run from the Town of Warrenton's raw water intake (just upstream of Route 672) to a point 5 miles upstream of the proposed multiple purpose structure near Airlie (Fauquier County).
7f	III	PWS,g	The Quantico Marine Base Camp Upshur and its tributaries' raw water intake on Cedar Run (located approximately 0.2 mile above its confluence with Lucky Run) to a point 5 miles upstream.
7g	III	PWS,g	The proposed impounded waters of Licking Run above the multiple purpose impoundment structure in Licking Run near Midland (Fauquier County) upstream to a point 5 miles above the proposed impoundment.
7h	III	PWS,g	The proposed impounded waters of Cedar Run above the proposed multiple purpose impoundment structure on the main stem of Cedar Run near Auburn (Fauquier County), to a point 5 miles above the impoundment.
8	III	PWS	Tributaries to the Potomac River in Virginia

			between Chain Bridge and the Monacacy River from their confluence with the Potomac upstream 5 miles, to include Goose Creek to the City of Fairfax's raw water intake, unless otherwise designated in this chapter.
8a	VI	PWS	Big Spring Creek and its tributaries in Loudoun County, from its confluence with the Potomac River upstream to their headwaters. (The temperature standard for natural trout water may be exceeded in the area above Big Spring and Little Spring at Routes 15 and 740 due to natural conditions). This section was given a PWS designation due to the Town of Leesburg's intake on the Potomac as referenced in Section 8b below.
8b	III	PWS	Those portions of Virginia tributaries into the Potomac River that are within a 5 mile distance upstream of the Town of Leesburg's intake on the Potomac River, unless otherwise designated in this chapter.*
8c	III	PWS	Those portions of Virginia tributaries into the Potomac River that are within a 5 mile distance

			upstream of the County of Fairfax's intake on the Potomac River.*
9	III		Broad Run, Sugarland Run, Difficult Run, Tuscarora Creek, Sycoline Creek, and other streams tributary to streams in Section 8 from a point 5 miles above their confluence with the Potomac River to their headwaters, unless otherwise designated in this chapter.
9a	III	PWS	All the impounded water of Goose Creek from the City of Fairfax's water supply dam upstream to backwater, and its tributaries above the dam to a point 5 miles above the dam.
9b	III	PWS	The Town of Round Hill's raw water intake at the Round Hill Reservoir, and including the two spring impoundments located northwest of the town on the eastern slope of the Blue Ridge Mountains.
9c	III	PWS	Unnamed tributary to Goose Creek, from Camp Highroad's raw water intake (Loudoun County) located in an old quarry (at latitude 39°02'02"; longitude 77°40'49") to its

			headwaters.
10	III		Tributaries of the Potomac River from the Monacacy River to the West Virginia-Virginia state line in Loudoun County, from their confluence with the Potomac River upstream to their headwaters, unless otherwise designated in this chapter.
10a	III	PWS	North Fork Catoctin Creek from Purcellville's raw water intake to its headwaters.
10b	III		South Fork Catoctin Creek and its tributaries from its confluence with the North Fork Catoctin Creek to its headwaters.
11	IV	pH-6.5-9.5	Tributaries of the Potomac River in Frederick and Clarke Counties, Virginia, unless otherwise designated in this chapter.
	V	pH-6.5-9.5	Stockable Trout Waters in Section 11
	***		Back Creek (upper) from Rock Enon 4 miles upstream.
	***		Back Creek (lower) from Route 600 to the mouth of Hogue Creek - 2 miles.
	***		Hogue Creek from Route 679 upstream 6 miles to the Forks below Route 612.

	vi		Opequon Creek (in Frederick County) from its confluence with Hoge Run upstream to the point at which Route 620 first crosses the stream.
	vi		Turkey Run (Frederick County) from its confluence with Opequon Creek 3.6 miles upstream.
	VI	pH-6.5-9.5	Natural Trout Waters in Section 11
	ii		Bear Garden Run from its confluence with Sleepy Creek 3.1 miles upstream.
	iii		Redbud Run from its confluence with Opequon Creek 4.4 miles upstream.
11a	IV	pH-6.5-9.5	Hot Run and its tributaries from its confluence with Opequon Creek to its headwaters.
	V	pH-6.5-9.5	Stockable Trout Waters in Section 11a
	vi		Clearbrook Run from its confluence with Hot Run 2.1 miles upstream.
12	IV	pH-6.5-9.5	South Branch Potomac River and its tributaries, such as Strait Creek, and the North Fork River and its tributaries from the Virginia-West Virginia state line to their headwaters.
	V		Stockable Trout Waters in Section 12

vi	Frank Run from its confluence with the South Branch Potomac River 0.8 mile upstream.
vii	South Branch Potomac River (in Highland County) from 69.2 miles above its confluence with the Potomac River 4.9 miles upstream.
vi	Strait Creek (Highland County) from its confluence with the South Branch Potomac River 3.9 miles upstream.
VI	Natural Trout Waters in Section 12
ii	Blights Run from its confluence with Laurel Fork (Highland County) upstream including all named and unnamed tributaries.
ii	Buck Run (Highland County) from its confluence with Laurel Fork upstream including all named and unnamed tributaries.
ii	Collins Run from its confluence with Laurel Fork upstream including all named and unnamed tributaries.
ii	Laurel Fork (Highland County) from 1.9 miles above its confluence with the North Fork South Branch Potomac River upstream including all named and unnamed tributaries.

ii	Locust Spring Run from its confluence with Laurel Fork upstream including all named and unnamed tributaries.
ii	Lost Run from its confluence with Laurel Fork upstream including all named and unnamed tributaries.
ii	Mullenax Run from its confluence with Laurel Fork upstream including all named and unnamed tributaries.
ii	Newman Run from its confluence with Laurel Fork upstream including all named and unnamed tributaries.
ii	Slabcamp Run from its confluence with Laurel Fork upstream including all named and unnamed tributaries.